

Claims

1. A vaccine for the therapeutic or prophylactic immunisation against Venezuelan Equine Encephalitis (VEE) virus, said vaccine comprising a vector which includes a sequence which encodes an attenuated form of said virus which is capable of producing a protective immune response, wherein the said sequence is such that the amino acid at position 7 in the E2 protein of VEE is lysine.

10 2. A vaccine according to claim 1 wherein the attenuated form of said virus comprises a derivative of the TC-83 construct.

15 3. A vaccine according to claim 2 wherein the vector comprises a virus vector.

4. A vaccine according to claim 3 wherein the virus is selected from an attenuated virus

20 5. A vaccine according to claim 3 or claim 4 wherein the virus is selected from vaccinia, adenovirus, HSV, BCG or BCC.

6. A vaccine according to claim 5 which comprises an attenuated vaccinia virus.

25 7. A vaccine according to claim 6 wherein expression of the said attenuated VEE virus is under the control of a synthetic 7.5K vaccinia promoter which has been subject to mutation which increases the level of VEE virus protein production as compared to the wild-type 7.5K promoter.

8. A vaccine according to claim 7 wherein the said 7.5K promoter comprises a sequence selected from

30 TAAAAAATTGAAAATACATTCTAATTATTGCAC (SEQ ID No 2)

35 or

TAAAAAATTGAAAATATATTCTAATTATTGCAC (SEQ ID No 3).

40 9. A vaccine according to any one of the preceding claims which comprises a vector which includes a nucleotide sequence which encodes a further immunogenic peptide, and is able to express said sequence when administered to a mammal.

10. A vaccine according to any one of the preceding claims which further comprises a cytokine or an active fragment or variant thereof, or a vector which comprises a nucleotide sequence which encodes a cytokine or an active fragment or 5 variant thereof.

11. A vaccine according to claim 10 which comprises a vector which comprises a nucleotide sequence which encodes a cytokine or an active fragment or variant thereof.

10

12. A vaccine according to claim 10 or claim 11 wherein the cytokine is an interleukin.

15

13. A vaccine according to claim 10 wherein the interleukin is selected from human IL-2 or human IL-6.

14. A vaccine for the therapeutic or prophylactic immunisation against Venezuelan Equine Encephalitis (VEE) virus, said vaccine comprising a vaccinia virus vector which encodes an attenuated form of the VEE virus or a variant or fragment thereof which is capable of producing a protective immune response against VEE virus, expression of the said attenuated VEE virus being under the control of a synthetic 7.5K vaccinia promoter which has been subject to mutation which increases the level of VEE virus 25 protein production as compared to the wild-type 7.5K promoter

15. A pharmaceutical composition comprising a vaccine as defined in any one of the preceding claims and a pharmaceutically acceptable carrier or excipient.

30

16. A method for producing a protective immune response against VEE virus in a mammal, which method comprises administering to said mammal, a vaccine according to any one of claims 1 to 14.

35

17. A method according to claim 16 wherein the mammal is either a human or a horse.

40

18. A multivalent vaccine comprising a vaccine according to any one of claims 1 to 14 and a further vaccine.